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cankers on the twigs. Twig cankers due to the black rot fungus (*Sphaeropsis*) is also reported as being frequent. Apple scurf, a twig disease, is described as due to *Phyllosticta* or *Phoma prunicola*.—E. MEAD WILCOX.

**The roots of *Lycopodium Selago*.**—MISS SAXELBY<sup>5</sup> has studied the origin of the roots of *Lycopodium Selago*, working with young plants grown from bulbils. She reports that the roots arise near the apex of the stem, but below the first leaves, and grow down through the cortex of the stem, emerging at the level of the ground. It is probable that "origin below the first leaves" is too sweeping a statement, for in preparations made by the reviewer from the same species the roots usually arise higher up than the first leaf. Miss SAXELBY finds that the dermatogen of the root arises from several cells of the innermost layer of the stem periblem; while the periblem and plerome arise from the plerome of the stem. It is interesting to note that the author finds three meristematic regions: plerome, periblem, and a dermatogen which forms both epidermis and root cap. The roots are usually diarch, with the metaxylem in the form of a horseshoe; but they may be tetrarch, with the metaxylem in two parallel bands; or there may be a transition between the two conditions.—ALMA G. STOKEY.

**Germination of *Fucus*.**—KNIEP finds ninety pages barely sufficient to relate and discuss the observations of three and a half months, at Bergen, on the physiology of fertilization and germination in *Fucus serratus*, *F. vesiculosus*, and *F. spiralis*.<sup>6</sup> After a serious attempt it appears impracticable for the reviewer to discover in this voluminous paper the author's results and conclusions, for he does not make clear the outcome of his work, nor anywhere give so much as a line by way of summary regarding a single topic. His observations were directed particularly to the influence of external factors on the gametes and sporelings. The main topics are the effect of concentration of the total salts in sea water upon the movement of sperms, fertilization, germination, and geographical distribution; the influence of temperature (brief); the directive and formative effects of light; certain phases of regeneration in sporelings; and finally the possible induction of polarity by chemical stimuli.—C. R. B.

**Californian Hepaticae.**—HUMPHREY publishes together a series of notes on the physiology and morphology of certain Californian Hepaticae.<sup>7</sup> He reports that *Fossombronia longiseta*, *Fimbriaria californica*, *Aneura multifida*, *Anthoceros Pearsoni*, and *Porella Bolanderi* are infested commonly with fungi, parasitic in the first case, symbiotic in the second, and epiphytic in the last three. In *Fegatella conica* fertilization occurs in early spring, the spores pass the dry

<sup>5</sup> SAXELBY, E. MARY, The origin of the roots in *Lycopodium Selago*. *Annals of Botany* 22:21-33. pl. 3. 1908.

<sup>6</sup> KNIEP, H., Beiträge zur Keimungs-Physiologie und -Biologie von *Fucus*. *Jahrb. Wiss. Bot.* 44:635-724. figs. 12. 1907.

<sup>7</sup> HUMPHREY, H. B., Studies in the physiology and morphology of some California Hepaticae. *Proc. Wash. Acad. Sci.* 10:1-50. pls. 1, 2. 1908.